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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,786	02/12/2001	Kyung-Ju Choi	00-6AAF (DN7814)	6972
7590 01/02/2004		EXAMINER		
Polster, Lieder, Woodruff & Lucchesi		CECIL, TERRY K		
763 South New Ballas Road, Suite 160		ART UNIT		
St. Louis, MO 63141		PAPER NUMBER		

1723

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/781,786

Applicant(s)

CHOI, KYUNG-JU

Examiner

Mr. Terry K. Cecil

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-45 is/are pending in the application.
- 4a) Of the above claim(s) 19-27 and 29-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 14 July 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Concerning the notice of non-responsive amendment mailed 9-16-2003, it is noted that Applicant has now fully responded to the drawing objections of the prior office action in view of his arguments filed 10-14-2003 and his amendment to the drawings of 7-14-2003.

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 45 and the dependents thereof (claims 29-44) are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Applicant has canceled linking claim 28; new claim 45 and its dependents are now geared to the non-elected Invention II (claims 19-27) and are restrictable from elected Invention I for the same reasons as set forth in the restriction requirement mailed 1-08-2003.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 45 and 29-44 are withdrawn from consideration as being directed to a non-elected invention along with claims 19-27. See 37 CFR 1.142(b) and MPEP § 821.03.

Applicant's election of Invention I without traverse (see the prior office action) is made final.

Claim Objections

2. Claims 12-13 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel

the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form. It is not seen how an equation that approximates the mean flow pore diameter or the air frazier permeability the mulilayer filter media further limits the structure thereof.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 3, 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the publication entitled Air Permeability and Pore Distribution of a Dual-Layered Microglass Filter Medium in Vol. 6 of Advances in filtration and Separation Technology of the AFS Society 97-99 (1994), hereinafter "The A-P Reference" in view of Ichihara et al. (U.S. 4,093,437). The A-P Reference teaches a coarse fiber thickness layered against a fine fiber thickness and arranged such that the overall average pore size is smaller than the pore size of the finest layer (as in claim 1). This is shown in figure 1. As for claim 6, the media would be separate face-to-face thicknesses since the filter is a "dual-layered" type. The A-P reference does not teach each of

the thicknesses being comprised of selected filter fiber of differing denier sizes. However, such is taught by Ichihara (col. 2, lines 33-55) [as in claims 1 and 11]. It is considered that it would have been obvious to one ordinarily skilled in the art at the time of the invention to have the layers of the A-P reference to have selected fiber of differing denier sizes as in Ichihara, since Ichihara teaches the benefits of improved dust holding capacity and air filter efficiency and high mechanical strength. The way in which the fiber sizes and pore sizes are calculated fail to further structurally limit the multi-layered filter media beyond the structural requirements that (i) the overall average pore size of the combined layers is smaller than that of the finest fiber thickness and (ii) each layer is comprised of fibers of differing deniers.

As for claim 3, layer 1 includes fibers 6d or larger and layer 3 includes fibers less than 6d; and, as for claim 5, the multi-layer structure is integral (col. 1, line 50).

As for claims 6-10, a thermosetting resin, e.g. an acrylic chemical resin is used to bind the layers of Ichihara together.

As for claims 12 and 13, the equations developed by the applicant to describe the mean flow pore diameter and the air frazier permeability of a multiple layered filter product would also apply to the filter of A-P, as modified by Ichihara.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the A-P Reference in view of Ichihara, as applied to claim 1 and in further view of Cusick et al. (U.S. 5,800,586).

Claim 2 has the limitation of the fibers being carded and chopped and substantially opened and aligned. As shown in figure 11, Cusick teaches carding of fibers to form an open and aligned layer. As in the applicant's specification, carding results in opened and aligned fibers (page 15, lines 1-4). It is considered that it would have been obvious to one ordinarily skilled in the art at the time of the invention have the layers of the A-P Reference in view of Ichihara to be carded as in Cusick, since Cusick teaches the benefit of forming composite filter media sheets in an economical manner (col. 1, line 43). Both Ichihara and Cusick teach fibers of a desired length such that chopping the fibers to the desired length before forming the filter layers is within ordinary skill.

6. Claims 4, 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the A-P reference in view of in view of Ichihara, as applied to claim 1 and in further view of De Villiers. Claim 4 has the limitation of each filter thickness including fibers of three different specific deniers. Claims 14-17 have limitations concerning the length and percentage of denier sizes for the filter fibers. De Villiers teaches using a combination of low melt and regular fibers approximately 1-2 inches and of various fine, intermediate and coarse denier fiber sizes and percentages. It is considered that it would have been obvious to one ordinarily skilled in the art at the time of the invention to have the combination of fibers of De Villiers in the invention of the A-P reference, as modified by Ichihara, since DeVilliers teaches the benefit of increased rigidity and stability (col. 5, lines 45-50). It is considered that it would have been obvious to one ordinarily skilled in the art at the time of the invention to have the specific sizes and percentages as in claims 4 and 14-17 since De Villiers teaches that the "relative percentages and components

and fibers...will determining the performance of the efficient layer and will be selected bearing the desired characteristics in mind.” The percentages would be chosen depending upon the intended use. It would also be obvious to optimize the denier size of the fibers depending upon the specific environment, type of liquid etc. in which the filter will operate in—as taught by De Villiers et al. (U.S. 5,480,464) at col. 5, lines 10-16 and as also realized by the applicant (page 8, lines 18-20).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the A-P reference in view of Ichihara, Cusick and De Villiers. The A-P reference in view of Ichihara and Cusick has been expanded above and teaches all the limitations of claim 18 except for the three difference deniers for each layer of a specific value. As explained above, De Villiers teaches a fiber layer with three different deniers and that it is considered that it would have been obvious to one ordinarily skilled in the art at the time of the invention to have the specific sizes as in claim 18, since De Villiers teaches that the “relative percentages and components and fibers sizes...will determine the performance of the efficient layer and will be selected bearing the desired characteristics in mind.” The specific deniers and number of deniers would be chosen depending upon the intended use. It would also be obvious to optimize the denier size of the fibers depending upon the specific environment, type of liquid etc. in which the filter will operate in—as taught by De Villiers et al. (U.S. 5,480,464) at col. 5, lines 10-16 and as also realized by the applicant (page 8, lines 18-20).

Also, the way in which the fiber sizes and pore sizes are calculated fail to further structurally limit the multi-layered filter media beyond the structural requirements that (i) the overall average pore size of the combined layers is smaller than that of the finest fiber thickness and (ii) each layer is comprised of fibers of differing deniers. Also, the equations developed by the applicant to describe the mean flow pore diameter and the air frazier permeability of a multiple layered filter product would also apply to the filter of A-P, as modified by Ichihara.

Response to Arguments

8. Applicant's arguments in the amendment of 7-14-2003 have been fully considered but are unpersuasive. It is contended that the essence of the applicant's invention is as follows.

Applicant has determined equations that describe the Mean flow pore diameter and air frazier permeability of a multilayer filter media in terms of the air frazier, mean pore diameter and porosity of each layer in the composite. He then uses this equation to determine the characteristics of each layer in order to have the desired characteristics in the final multi-layer filter media product. However, the applicant has not shown any structural difference between his product and that of the applied A-P reference (as modified by Ichihara) which teaches the claimed structural limitations of (i) an overall average pore size of the combined layers that is smaller than that of the finest fiber thickness and (ii) each layer is comprised of fibers of differing deniers. Applicant's invention concerning how this final product is manufactured is more conducive to his method claims—which have been withdrawn.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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10. Contact Information:

- Examiner Mr. Terry K. Cecil can be reached at (571) 272-1138 (at the Carlisle campus in Alexandria, Virginia) for any inquiries concerning this communication or earlier communications from the examiner. Note that the examiner is on the increased flextime schedule but can normally be found in the office during the hours of 8:00a to 4:30p, on at least four days during the week M-F.
- The group receptionist can be reached at (703)308-0661 for inquiries of a general nature or those relating to the status of this or proceeding applications.
- Wanda Walker, the examiner's supervisor, can be reached at (571) 272-1151, if attempts to reach the examiner are unsuccessful.
- The Fax number for official faxes is 703-872-9306.



Mr. Terry K. Cecil
Primary Examiner
Art Unit 1723

TKC
December 22, 2003